Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington D.C. 20554

In the Matter of	**)**	
	)	
A National Broadband Plan	**)**	**GN Docket No. 09-47, 09-51, 09-137**
For Our Future	**)**	**PS Docket Nos. 06-229, 07-100, 07-114**
	)	**WT Docket No. 06-150**
	)	**CC Docket No. 94-102**
	)	**WC Docket No. 05-196**

COMMENTS OF
SKYFIBER, INC.
ON PUBLIC NOTICE # 8 PUBLIC SAFETY, HOMELAND SECURITY, AND CYBERSECURITY ELEMENTS OF THE NATIONAL BROADBAND PLAN

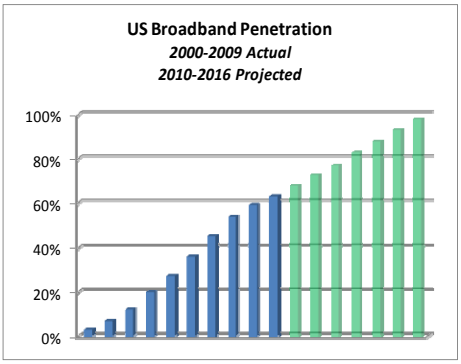
SkyFiber, Inc. ("SkyFiber") is pleased to submit these Comments in response to the Commission's Public Notice #8 regarding public safety, homeland security, and Cybersecurity issues relating to broadband.[1] SkyFiber applauds the Commission's efforts to develop a National Broadband Plan that will meet the needs of public safety and address homeland security concerns. SkyFiber recognizes that fiber optic facilities and conventional wireless infrastructure suffer from certain practical and economic limitations that make those transmission methods unsuitable for some deployments, including in a public safety and disaster response context. In developing its broadband plan for public safety and homeland security, the Commission should consider a solution set that includes *all* available transmission media in order to make expanded broadband deployment a realistic possibility for as many geographic areas and communities of interest in the United States as possible. With that goal in mind, SkyFiber herein provides information regarding Optical Wireless Broadband technology, an innovative and proven wireless approach

[1] DA 09-2133 (released September 28, 2009)

that can be made available at lower cost than other facilities and services in certain deployments, is easily deployed, has superior security attributes, and does not rely on conventional radio frequency spectrum or fiber optic facilities,

I. Introduction & Purpose

Imagine this scenario: Four years from now we have 98% nationwide Broadband Access coverage. Every Hospital, School, Library, and Emergency Center is connected to the vast wealth of information on the internet. Public Safety services can inter-operate seamlessly, saving lives through better communication. Even in rural and impoverished areas the majority of the population has Broadband access, and President Obama's goal of the United States leading the world in Broadband penetration has been realized.



Sources: *Pew Internet & American Life Project, 2009, and Gartner Research.*

Now we must ask: Given the time, cost, and spectrum reallocation demanded by traditional cellular wireless, satellite, microwave RF, and fiber optic infrastructures, is such a scenario realistic? If we keep plodding forward with our traditional technologies, how long would it realistically take to reach 98% penetration? According to a recent Gartner study, 77% of U.S. households will have access to Broadband, by 2012. This projection that indicates we would not reach 98% nationwide coverage until 2016 at best. But without a doubt, the needs of our Public Safety services need to be met far more quickly.

President Obama has specifically stated his goal to expand Broadband Internet access across communities nationwide. "It is unacceptable that the United States ranks 15th in the world in Broadband adoption," Obama said. He added: "Here, in the country that invented the Internet, every child should have the chance to get online." In efforts to facilitate Broadband expansion, the FCC has been making great strides in freeing

up more spectrum for high-speed Internet access, but the FCC is also acutely aware that adding spectrum is a painstakingly slow and incomplete solution. In Chairman Genachowski's words "It takes years to reallocate spectrum and put it to use, but we have no choice. We must identify spectrum that can best be reinvested in mobile Broadband."

But there ***is*** a choice. Or more specifically, a complementary technology that can enable the re-purposed spectrum to be used more quickly and effectively, and address the fact that even when all the slated spectrum reallocation is completed, it ***still*** will not be enough to meet the growing needs. Building out the fiber optic network will also get us closer to the goal, but both of these traditional transmission methods suffer from practical, environmental, and cost limitations that make them economically unviable or technologically unsuitable for certain deployments, including in the context of public safety and disaster response.

That complementary technology is Optical Wireless Broadband, or OWB. Optical Wireless Broadband technology is an innovative and proven wireless approach that can be made available at far lower cost than other transmission mediums. OWB can be rapidly deployed, allowing for aggressive dissemination of bandwidth, in a matter of days versus the months that fiber can take. It also has superior security attributes, and does not rely on conventional radio frequency spectrum. Optical Wireless Broadband is a line-of-sight technology that transmits light through the atmosphere, as compared to fiber optic cable systems that transmit light through glass strands in a cable. OWB relays information at Gigabit speed, and without the environmental and security concerns inherent in cellular or microwave RF communications.

Optical Wireless Broadband technology is a valuable tool in the challenge to provide nationwide Broadband, and to meet Public Safety and Homeland Security needs. It can serve as inexpensive backhaul for the wireless networks, freeing up all spectrum to be used for local base station broadcast needs only.

OWB is the optimal solution for taking Broadband into areas where laying fiber is far too expensive, or where the trenching needed is too environmentally damaging. All the time delays that are incurred when trying to secure spectrum or getting permits to lay fiber evaporate, as Optical Wireless Broadband can be deployed in as little as 4 hours and requires no special spectrum or permit considerations.

SkyFiber's purpose in this submission is to ensure that the FCC is fully aware of advanced Optical Wireless Broadband technology and what role such technology can play in implementing the National Broadband Plan. The FCC must not take a narrow view but instead be sure to consider the full range of technologies available to meet the Nation's Broadband needs. Innovative and proven transmission technologies like OWB exist today that are the most suitable choice based on price, time & ease of deployment , security, capacity flexibility for a wide variety of network installations. Optical Wireless Broadband technology offers uniquely qualified solutions to address the critical needs of Public Safety Networks, NG911, and Cybersecurity/Homeland Security. The remainder of this submission will focus on the potential of Optical Wireless Broadband to address both the general needs for building out National Broadband Access and ensuring Homeland Security, as well as OWB's contributions to the specific issues raised in the FCC Public Notice #8 (DA 09-2133).

II. Optical Wireless Broadband's Role in the National Broadband Access Plan

Nationwide Broadband connectivity will indisputably not only fuel economic growth, but will also support our country's emergency services communications. High-speed Broadband connectivity enables first responders to collaborate and receive information in real-time, enhancing their situational awareness and speeding their response to emergencies. As we race to build out the nation's networks and Public Safety Wireless Networks, Optical Wireless Broadband can play a pivotal role in extending Broadband access in four key areas:

- Delivering Last Mile connectivity

- Expanding Mobility Backhaul
- Providing Broadband to Rural Areas
- Serving Environmentally Sensitive Areas

Last Mile Connectivity

Determining how to serve currently unreachable markets by extending service from the fiber point of presence to the next mile is an essential piece of the puzzle to ensure ubiquitous Broadband connectivity that provides for public safety needs. Connecting that last hop, the “last mile”, between the fiber and the majority of end users can be costly and problematic, particularly when the environmental impact of trenching to lay fiber is considered.

The capital cost of laying fiber is high, even in areas of low population density. This limits the financial viability of extending service through low-density areas, even when higher density areas lay beyond. Although installation costs can be wrapped into the capital outlay, other costs impact operating expense including easement access and rights of way. Optical Wireless Broadband offers a low cost high-bandwidth alternative that is easy to install, does not cause any environmental impact, and allows an operator to rapidly extend high bandwidth over the next mile in a few hours - rather than the weeks, months or, in some cases, years needed by other technologies. The fiber-less implementation also bypasses economic obstacles like conflicting easements or even bodies of water. OWB facilitates the ability to reach into markets traditionally served by microwave communications and to extend to higher density locations that are economically beyond fiber's reach.

Expanding Mobility Backhaul

OWB’s critical role in Mobility Backhaul is addressed in the section responding to FCC’s Public Notice #8 Section 1: Public Safety Mobile Wireless Broadband Networks.

Broadband in Rural Areas

Expanding Broadband Access to the country's rural, underserved areas has always been hindered by the high cost of laying fiber or building out Wireless RF networks. With the lowest cost per megabyte in the industry, Optical Wireless Broadband in many cases is the only economically viable solution for connecting low-populations areas that cannot absorb the expense of laying fiber. OWB can be deployed in a fraction of the time and at up to 80% lower cost than required for traditional solutions such as fiber optics and microwave communication. One of the FCC's top concerns is ensuring that all American's receive rapid response in emergency situations, and that means finding an economically sound way to reach even the most remote areas of the country.

Environmental Sensitivity

Optical Wireless Broadband is a very "green" technology, which can be a major concern as we reach into our more environmentally sensitive, less populated areas. OWB generates no RF smog pollution unlike Microwave RF, and has low power consumption (10Gbps/W vs. 1.7Mbps/W for MW). That's only about 33% of the power consumption of most RF links at comparable data capacity. Optical Wireless Broadband requires no environmentally invasive trenching, in contrast to fiber optics which can have significant negative impact on an ecosystem both in terms of the ground that is torn up in the installation process as well as in the large carbon footprint resulting from all the necessary construction work. Aerial fiber is another option that does not require trenching, but instead it requires installation of poles and hanging cable, marring the natural landscape. Even more important, aerial fiber is easily impacted by natural disasters, only a strong wind storm is needed to blow down poles, effectively severing communications during critical times for emergency service and disaster recovery communications to be reliable.

III. Optical Wireless Broadband's Role in the specific Issues of FCC Public Notice #8

FCC Public Notice #8 SECTION 1: Public Safety Mobile Wireless Broadband Networks.

This section of the Public Notice focuses on the relationship between Public Safety needs and the current and future state of the nation's Mobile Wireless Broadband Networks. Optical Wireless Broadband has a vital role in building these networks up to the level demanded by the country's Public Safety needs. In particular, the Public Notice asks how we can best meet the needs of the public safety community for mobile wireless networks and what resources are necessary to satisfy public safety Broadband needs for mobile wireless services. The answer to this question is clear: the largest issue impacting the Mobility Industry's ability to meet Public Safety needs today is the upcoming spectrum & backhaul crisis. More than any other mobility networking issue, this problem must be resolved.

Mobility Backhaul

Mobility operators' cannot currently provide sufficient backhaul capacity to address the wireless Broadband traffic that will be needed to ensure reliable wireless connectivity for public safety needs. Both the industry and the FCC are keenly aware of the "looming spectrum crisis" as referred to by Chairman Genachowski. The emergence of 4G and long term evolution (LTE) networks only compound the challenge of under-engineered backhaul networks. As discussed previously, re-purposing spectrum for mobile usage is only a piece of the solution. New and innovative technology such as Optical Wireless Broadband is a key component to solving this problem, not only because it relieves some of the spectrum bottleneck, but also because it re-casts the economics of building out the nation's mobility networks.

According to ABI Research, CAPEX for cellular backhaul is expected to reach $23 billion by 2012, with OPEX expenditures reaching $6 billion. Controlling and reducing these expenditures will make or break the delivery of nationwide wireless Broadband network, and the innovative

solution that Optical Wireless Broadband can offer provides a desperately needed high-bandwidth low-cost alternative to traditional technologies. A solid, secure nationwide Broadband solution that supports a dependable Mobile Wireless network is critical to ensure the communications needs for Public Safety.

Today, the vast majority of backhaul is provided by T1 lines with an average of two to three circuits per base station. Fiber and microwave can only resolve a portion of the backhaul issues; the construction and on-going operational costs make a fiber to base station approach economically viable for only a fraction of base stations. The time, cost and RF pollution incurred with Microwave make it impractical for many applications as well.

Unconventional backhaul methods, such as the use of low-cost, Optical Wireless Broadband infrastructure makes total installation less expensive. OWB empowers mobile operators to cost-effectively increase bandwidth in densely populated last mile areas and handle increasing capacity demands.

FCC Public Notice #8 SECTION 2: Next Generation 911 (NG911)

This section of the Public Notice focuses on the ability of our nation's current level of connectivity to meet the needs of Next Generation 911 technology, and how to ensure network survivability and disaster recovery. In particular, the Notice asks how the American public can use Broadband technologies to better communicate with emergency responders, what the public safety community including PSAPs needs to do to enable emerging internet applications that reliably deliver voice, video and data information, and what architecture and technology solutions would best accomplish these goals. To enable PSAPs to reliably deliver voice, video and data, they need a stable, secure,

interconnected network that can handle significant amounts of bandwidth. Once again, they need a nationwide Broadband network, which Optical Wireless Broadband can help to build.

Emergency Services & Disaster Recovery:

In disaster recovery situations, the ability to rapidly deploy communications can save lives. Optical Wireless Broadband is ideally suited for such solutions, as it can be immediately installed to restore high-speed network connectivity within hours after a man-made or natural disaster occurs. In situations where buildings and network infrastructure have been destroyed, a network consisting of optical links can be put in place without delay to restore Broadband connectivity for LANs and other mission critical networks. Government or municipal authorities and disaster response personnel can easily tap into existing fiber networks to wirelessly connect remote deployment locations, activating data connections essential for supporting vital assistance resources. Because it is secure and easily portable - an entire system can fit inside a suitcase – OWB can be rapidly installed without waiting on service provider availability or costly installation expertise. Also, links can be easily relocated to changing emergency command posts.

Optical Wireless Broadband can also be installed as a backup network to existing communications infrastructure, delivering a city-wide Disaster Recovery Network. This provides a continuity plan for access to a backup network and redundant points of connectivity that can withstand disaster damage or other unexpected outages at an economically feasible price. Emergency First Responders and Fire departments alike need high-bandwidth information delivery to gain access to medical data and on-scene video feeds during in-progress events. Only stable, secure Broadband connectivity can provide the kind of real time communication needed to save lives.

FCC Public Notice #8 SECTION 2: Cyber security

This section of the Public Notice focuses on ensuring the security of our nation's government and commercial computer systems. In particular, the Public Notice asks what type of computer-based attacks against government or commercial computer systems or networks are anticipated to occur; how do we prevent, prepare, detect and respond to cyber attacks; and what are the specific wireless network features and capabilities necessary to combat such attacks. First, we discuss the critical features of a highly secure communications technology such as Optical Wireless Broadband. Then we discuss how to ensure protection from a specific type of cyber-attack, and close with Homeland Security needs.

Highly Secure Communications:

The fundamental security of our networks is more important than at any other time in history. Built on the most inherently secure technology in the industry, Optical Wireless Broadband is virtually impenetrable. Unlike RF links, highly secure (Military Grade) links cannot be detected outside the beam. Traditional network communication technologies used to provide Broadband connectivity pose significant risks to secure data transmission. Microwave RF and Cellular technologies both have significant issues with maintaining the security of data; they can use encryption, but have no way to prevent the broadcast signal from being intercepted. Both radio and fiber optics have been proven to be susceptible to the interception or jamming of transmission signals. Even more concerning, it is often difficult to detect when a transmission has been compromised.

Optical Wireless Broadband is the most secure way possible to transmit data, using a narrow beam of invisible light rather than a radio broadcast to transmit data. It does not interfere with radio, television, microwave or emergency frequencies even when thousands of OWB beams are

concentrated in a small area. This “non-interference” capability not only applies to radio, it applies to other Optical Wireless Broadband data links as well. A million OWB beams could pass through a single point without interfering with each other – or creating the potential for “data bleed” that would put the privacy of information at risk. Unlike radio, or even fiber optic cable, it is virtually impossible to intercept data transmitted over an optical wireless connection. In addition, radio transmissions are susceptible to jamming technology, but OWB transmissions are immune. Optical Wireless Broadband provides the most secure means for organizations to deploy high capacity transmissions to multiple facilities and offers short implementation times, military grade security, and the elimination of public carrier data line charges.

Storage Area Networks (SAN) and disk mirroring

One crucial area of Cyber-security is the constant threat of attack by cyber-terrorists on vital data centers which store financial and other sensitive data. The best way to combat these attacks is to create back-up data centers using Broadband connectivity and disk mirroring. This preserves the data at geographically diverse backup sites, and prevents disruption of services. The main obstacle to this type of connectivity is getting last-mile Broadband access connectivity. Low-cost yet highly secure, Optical Wireless Broadband offers a superior approach to providing this last-mile connectivity and thereby combating such attacks and maintaining business continuity in a cost effective manner.

Homeland Security, including Law Enforcement, Ports & Border Control

Federal, municipal, or homeland security entities can cost-effectively maximize the benefits of nationwide Broadband access in a wide range of areas. This includes improving productivity of public safety and utility employees by moving the office to the field and providing enhanced security coverage at border crossing points. Cities and regions that use Broadband networks for

municipal purposes are showing significant returns on investment and improvements in public service, police departments across the U.S. already use Broadband networks for law enforcement and surveillance. Shipping ports use video surveillance to monitor incoming ships and cargo, and to ensure the safety of our ports. Such surveillance requires extensive bandwidth, and is often needed in areas where it's not possible to trench for fiber, and RF interference would be too great for Cellular or Microwave Wireless.

For example, the Port of Brownsville, Texas has leveraged Optical Wireless Broadband to deploy a state of the art surveillance monitoring system that allows the Port to rapidly identify ships attempting to enter the Port, and to immediately respond to an intrusion or unauthorized vessel. This type of deployment of low-cost, high-bandwidth OWB will enable the US to build out a truly nationwide broadband network, even in situations dealing with highly sensitive data that needs maximum security.

FCC Public Notice #8 SECTION 4: Alerting

This section of the Public Notice focuses on ensuring the security of our nation's government and commercial computer systems. In particular, the Public Notice asks how Broadband technologies are used as part of public emergency alert and warning systems, how to ensure the speed of message transmission of an issued alert from government agency to the public, and how Broadband technologies can improve the effectiveness of emergency alerts for all Americans, including people living in rural areas and other hard to reach segments of the population.

Alerting during Crisis Situations

In the wake of tragic events occurring at public schools and universities around the nation, many experts have come together to discuss alternatives and provide solutions for wireless emergency alert services. Without dispute, a nationwide Broadband Access network would provide greater

security and improved protection by initiating faster responsiveness in emergency settings. We have seen both the success of early alerting, as well as the disastrous failure of not having an alerting system in place in our nation's recent tragedies. The fatalities resulting from the April 16, 2007 shooting at Virginia Tech could possibly have been limited to a still tragic but less devastating 2 lives, versus the almost incomprehensible 33 lives that were lost that day. If an early alerting system had been put into place that locked down the campus when the first two victims were shot, which occurred a full ***2 hours*** before the shooter entered Norris Hall, the other 31 victims might not have been lost. The importance of effective, fast alerting systems in emergency situations cannot be over stated. To ensure that every part of the US is equipped with the communications needed to be prepared for emergency situations, it is imperative to have a fully functional nationwide Broadband Access network. This leads us once again back to Optical Wireless Broadband's ability to supplement the current National Broadband Plan, and facilitate a faster and less costly network roll out to ensure fast, ubiquitous emergency alerting capabilities, reaching all segments of the population, rural or otherwise.

IV. Summary

For all the advantages Fiber Optics and RF Wireless have to offer, these technologies alone cannot fulfill the goal of true nationwide Broadband Access. The National Broadband Plan should not be constrained by the limits of these access strategies. There are many situations where trying to install fiber optics is not the best choice or even an option due to environmentally invasive trenching, high cost, and lengthy time to gain right of way and to complete installation. Optical Wireless Broadband is the optimal solution in these situations.

In conclusion, to meet the challenge of spreading Broadband coverage across the US, the FCC needs to make new game-changing technology like Optical Wireless Broadband a significant part of its Broadband

delivery plan. OWB is an acceleration strategy for Broadband deployment that will make it feasible to reach that last 20% of the population, which are likely the most difficult and expensive 20% to reach. To ensure success, the FCC needs to have at its disposal a solution set that includes all available transmission media in order to make Broadband deployment a realistic possibility for as many geographic areas and communities in the United States as possible. Using complementary innovative solutions like Optical Wireless Broadband will ensure success as the FCC drives to build out the nation's infrastructure.

Respectfully submitted,

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November 12, 2009